

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 3, 2018/2019

### ECP4136 – JAVA TECHNOLOGY (RE / TE)

29 MAY 2019  
9:00 a.m - 11:00 a.m  
( 2 Hours ) – OPEN BOOK

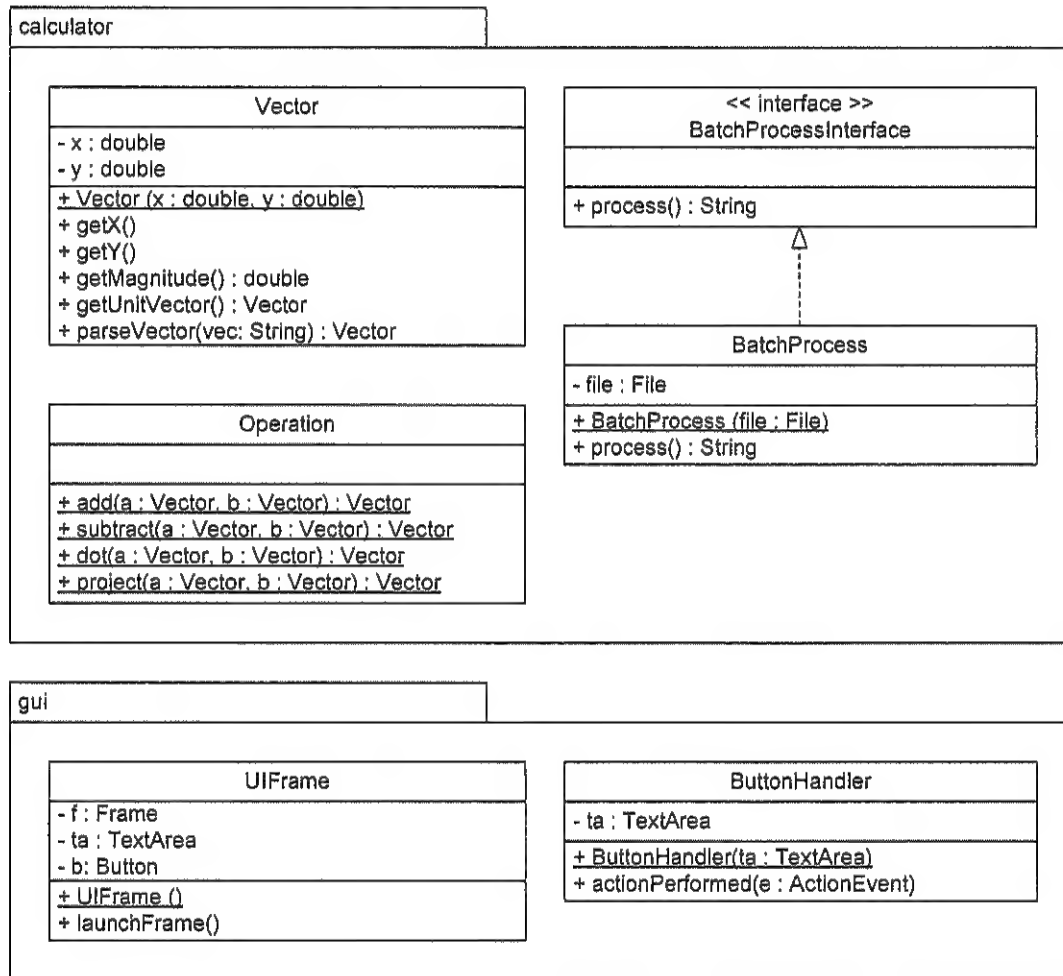
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#### INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 6 pages including cover page with 3 Questions only.
2. Attempt ALL questions. The distribution of the marks for each question is given.
3. This is an Open-Book examination.
4. Please write all your answers in the Answer Booklet provided.

**Instructions:**

Figure 1 shows the UML diagram of calculator package, gui package, BatchProcessInterface interface, Vector class, Operation class, BatchProcess class, UIFrame class, and ButtonHandler class. The UML diagram will be referred in Question 1, 2 and 3.



**Figure 1: UML Diagram**

Continued .....

**Question 1**

a) Implement the Vector class with the following requirements:

- Create the attributes specified by the UML diagram shown in Figure 1.
- Create the constructor that will save all parameters in the arguments. The parameters are the x-component and y-component of a vector.
- Implement getX method to retrieve the x attribute.
- Implement getY method to retrieve the y attribute.
- Implement getMagnitude method to compute the magnitude of the vector.
- Implement getUnitVector method to compute the unit vector. Note that a unit vector is also a vector.
- parseVector method parses a vector in String format. The following is an example of vector in String.

“<3,4>”

- Override toString method to return a String of the vector in the above format.

[1+2+1+1+1+2+3+1 marks]

b) The Operation class consists of static methods that do vector addition, subtraction, dot product and projection. Consider vector  $a$  and vector  $b$  are the two operands. Implement the Operation class with the following requirements.

- The add method adds two vectors, such that
$$a + b$$
- The subtract method performs vector subtraction, such that
$$a - b$$
- The dot method performs dot product, such that
$$a \cdot b$$
- The project method performs vector projection, such that
$$(a \cdot b)\hat{b}$$

[1+1+1+3 marks]

c) Create the BatchProcessInterface specified by the UML diagram shown in Figure 1.

[2 marks]

Continued .....

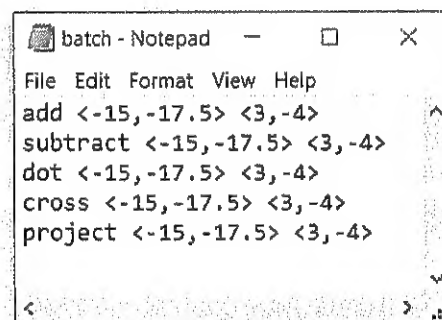
**Question 2**

- a) Create the `BatchProcess` class to implement the `BatchProcessInterface` with the following requirements.
- Create the attribute specified by the UML diagram shown in Figure 1.
  - Create the constructor that will save the `File` object in the arguments.
  - The following are the requirements for the process method.
    - The process method will open and read a text file that consists of a series of commands. Every command has 3 fields separated by a space character. The first field indicates the type of operation. The second field and the third field are the two vector operands. Figure 2 shows the content in the text file.
    - The process method will catch `Exception`. If an exception occurs, the method will return a string "Exception Occurs."
    - The process will operate the commands line-by-line. After processing all the commands, the method will return a `String` that contains the results of computations as shown in Figure 3.

[1+1+9 marks]

- b) Write a console program to open a text file named "batch.txt" and use process method in `BatchProcess` class to execute the commands in the text file. The results are then printed on the console.

[4 marks]

**Figure 2****Continued .....**

```
add <-15,-17.5> <3,-4>: <-12.0,-21.5>
subtract <-15,-17.5> <3,-4>: <-18.0,-13.5>
dot <-15,-17.5> <3,-4>: 25.0
cross <-15,-17.5> <3,-4>: Undefined Command
project <-15,-17.5> <3,-4>: <3.0,-4.0>
```

Figure 3

### Question 3

a) Create the UIFrame class specified by the UML diagram shown in Figure 1. UIFrame can be launched to present the user interface as shown Figure 4. The following are the requirements.

- The name of the Frame `f` is "Vector Computations".
- The Frame `f` uses BorderLayout
- The TextArea `ta` consists of 10 rows and 50 columns.
- WindowListener is added to the Frame `f` to terminate the program when the close button is clicked.
- The button is named as "Process".
- When the Process button is clicked, the action is handled by ButtonHandler.
- The components are added to the Frame `f` in the correct way.

[1+1+1+3+1+1+2 marks]

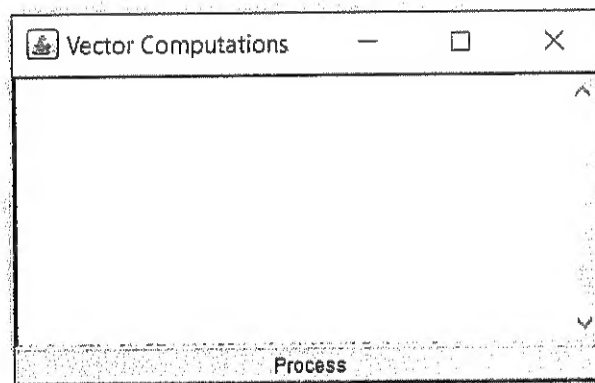


Figure 4

Continued .....

- b) Create the `ButtonHandler` class with the following requirements.
- Create the attribute specified by the UML diagram shown in Figure 1.
  - Create the constructor that will save the `TextArea` object in the arguments.
  - Implement the `actionPerformed` method with the following requirements.
    - The method opens a text file named “batch.txt” and use `process` method in `BatchProcess` class to execute the commands in the text file.
    - The results are then printed on the `TextArea` object.

[2+1+2 marks]

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